



# Depleted Uranium



November 2002

The following information will help you to become familiar with depleted uranium and how it relates to your health.

## What is depleted uranium?

Depleted uranium (DU) is a dense, slightly radioactive heavy metal used by the United States and other countries in making ammunition, armor, aircraft counterweights, and other materials. Because of its density and penetrating power, DU is an excellent material for making armor and armor-piercing weapons.

## Where is DU found?

Uranium is part of our natural environment. DU is a byproduct of the process that converts natural uranium into the enriched form used in commercial nuclear power plants for production of electricity and in nuclear weapons. DU has 40% less radioactivity than natural uranium. Military uses of DU include anti-tank ammunition, armor, and various uses as a shielding material. DU munitions were first used by the United States in combat in Operation Desert Storm. DU munitions were also used by NATO in the Balkans.

## How does DU enter the body?

As you learned in Depleted Uranium Awareness Training (see attachment), DU can be inhaled, swallowed, or even enter the body through cuts or abrasions on the skin, or through embedded metal fragments. However, if you exercise proper field and personal sanitation techniques (personal hygiene), you can prevent DU from being taken into the body by swallowing or through wounds.

DU can be inhaled during and immediately after DU munitions have impacted a vehicle or the DU munitions are involved in a fire on the battlefield. DU can also be inhaled if you are in or around armored vehicles when they are perforated by DU munitions, if you enter these vehicles to perform rescue operations, or if your duties require you to make repeated entries into these vehicles. DU can also be inhaled when DU particles in the environment are resuspended into the atmosphere by wind or other disturbances. Accidental inhalation may also occur as a consequence of a fire in a DU storage facility, an aircraft crash, or the decontamination of vehicles from within or close to conflict areas.

You might also encounter DU from “spent” (fired) munitions or fragments of munitions on the battlefield where DU fragments and particles may be in the soil or in dust on pieces of battlefield equipment. As long as you do not handle any “spent” munitions or fragments, you greatly reduce the possibility that DU can enter your body. In addition, if you exercise proper field and

personal sanitation techniques, such as washing your hands frequently, you will greatly minimize your risk of any potential adverse health effects. Follow your training guidelines by leaving “spent” DU munitions, fragments, and unexploded ordnance (UXO) (intact DU munitions) alone and notifying your chain of command if you find any. As always, you should follow proper procedures when handling any intact munitions.

## Are there potential health effects from exposure to DU?

Numerous studies over 50 years of individuals who inhaled particles of uranium and recent medical monitoring of individuals having DU fragments embedded in their wounds have shown no adverse health effects from their uranium or DU exposure.

At levels likely to be found in the field, exposure to DU, although slightly radioactive, has little potential to affect your health. DU emits primarily alpha radiation, which is not an external radiation hazard. The DU in armor and ammunition rounds is covered with other metals, further reducing the radiation dose. When DU is inhaled or ingested (eaten), small amounts are carried in the blood to body tissues and organs, much the same as with natural uranium. Small amounts of natural uranium are present in the air and food.

Potential adverse health effects from extensive, long-term exposure to DU (such as what might be found in industrial employees who work with uranium daily) would be the result of it being a heavy metal, similar to lead. Very high doses of heavy metals are known to damage the kidneys and can reduce the kidney’s ability to filter blood. However, studies have shown that very little DU ever reaches the kidneys even if it is inhaled, ingested or absorbed through a break in the skin. DU is normally exhaled, excreted, or washed away during wound cleaning. DU aerosols are inhaled and exhaled depending on the size of the DU particles since differently sized DU particles react differently in the respiratory tract. Only the smallest of particles reach deep into the lung, while very large particles are coughed out of the lungs.

## If DU munitions might be used or have been used in your area, what can you do to protect yourself?

Although the potential that battlefield exposure to DU will affect your health is very low, as an added measure of safety, you can further protect yourself by

simply practicing what you were taught in your Depleted Uranium Awareness Training.

- As with all battlefield debris, do not touch or move the object. This protects you not only from DU, but also from unexploded ordnance.
- Notify your chain-of-command of the location of any debris.

- Exercise standard field hygiene, including washing your hands and face as often as possible.
- Use the protective measures required for handling all munitions; no additional measures are necessary for unfired DU munitions.

#### Where can I get more information?

- **Armed Forces Radiobiology Research Institute (AFRRI)**

<http://www.afri.usuhs.mil/index.html>

- **ATSDR Uranium Toxicological Profile and Public Health Statement (September 1999)**

<http://www.atsdr.cdc.gov/toxprofiles/tp150.html>

- **US Army Center for Health Promotion and Preventive Medicine:**

*"Health Risk Assessment Consultation No. 26-MF-7555-00D"* (September 2000)—Human exposure assessment and health risk characterization in support of the environmental exposure report, *Depleted Uranium in the Gulf*, of the Office of the Special Assistant to the Secretary of Defense for Gulf War Illnesses, Medical Readiness and Military Deployments.

[http://www.deploymentlink.osd.mil/du\\_library/reports/medical\\_us.shtml](http://www.deploymentlink.osd.mil/du_library/reports/medical_us.shtml)

<http://chppm-www.apgea.army.mil>

Phone: 800-222-9698

Depleted uranium (DU) environmental and occupational health issues: Mr. David Alberth, 410-436-3502

Environmental sampling and risk assessment: Mr. Jeffrey Kirkpatrick, 410-436-8155

General medical information: Dr. Coleen Weese, 410-436-2578

- **DU Library: Depleted Uranium Information Page**

Deployment Health Support Directorate

[http://www.deploymentlink.osd.mil/du\\_library/index.shtml](http://www.deploymentlink.osd.mil/du_library/index.shtml)

- **Air Force Institute for Environment, Safety and Occupational Health Risk Analysis (AFIERA)**

Phone: 888-232-3764

<http://www.brooks.af.mil/afiera/>

General medical information: Lt Col (Dr.) Kenneth L. Cox, 210-536-1788

- **Navy Environmental Health Center (NEHC)**

Phone: 757-953-0764

<http://www-nehc.med.navy.mil>

General medical information: CDR (Dr.) Alan Philippi

- **Deployment Health Clinical Center (DHCC)**

Phone: 866-559-1627

<http://www.pdhealth.mil/>

Post-deployment health care information: LTC (Dr.) Charles Engel

- **Department of Veterans Affairs**

<http://www.va.gov/gulfwar>

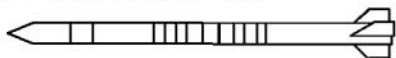
- **DU Awareness Training, US Army Chemical Center and School (USA TRADOC)**

<http://www.wood.army.mil/84chem/hhc/ttd/du.htm>

**ACTIONS TO BE TAKEN**

When finding penetrators or parts of penetrators —

- Leave the penetrator alone, as with all battlefield debris.
- Notify the chain of command of its location.



Assume a DU contamination zone of 50 meters around actively burning fires involving any armored combat vehicles or ammunition supply vehicles. If METT-TC permits, stay out of this area.

**EMERGENCY FIRST AID FOR DU WOUNDS**

The presence of DU does not change the procedures for first aid or rescuing the injured. Conduct rescue and administer first aid according to the Soldier's Manual of Common Tasks. Notify the chain of command that the person may have injuries involving DU, because additional medical testing may be required.

**THE MILITARY USE FOR DU**

The M2/3 Bradley fighting vehicle, M1-series tanks, and some US aircraft fire DU munitions. The M1A1/A2 Abrams heavy armor tanks use steel-encased DU for increased armor protection.

**DU CONTAMINATION**

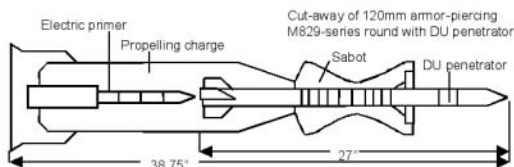
DU contamination, consisting of dust and fragments, can occur in three main ways:

- When a DU munition breaches armor.
- When DU armor is breached.
- When DU ammo burns.

This contamination can enter the body through the nose, mouth, and wounds.

**PROTECTIVE MEASURES FOR UNFIRED DU MUNITIONS AND INTACT DU ARMOR**

No additional protective measures are required for unfired DU munitions beyond those required for *all* munitions or for intact DU armor.

**\*GTA 3-4-1A****Depleted Uranium Awareness**

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**DEPLETED URANIUM (DU)**

Depleted uranium (DU) is a dense, slightly radioactive heavy metal used by the United States and other forces in munitions, armor, and other applications.

**HEALTH RISKS ASSOCIATED WITH DU**

Like lead and other heavy metals, internalizing large amounts of uranium could affect your health. The primary organ affected is the kidney.

**SITUATIONS WHEN DU PRESENTS A HAZARD**

You are in a situation where DU presents a hazard if you—

- Are in, on, or near (within 50 meters) an armored combat vehicle at the time it is struck by DU munitions or an M1A1/A2 Heavy Armor tank when it is struck and breached by any munition (DU or non-DU).
- Are near (within 50 meters) actively burning fires involving DU munitions.
- Decontaminate the crew compartment of a breached armored vehicle.
- Frequently enter vehicles with penetrated DU armor or vehicles penetrated by DU munitions.
- Find a penetrator.

**ACTIONS TO BE TAKEN**

When you are in, on, or near a vehicle at the time of impact by DU munitions or a DU-armored vehicle at the time of impact by munitions—

- Conduct combat lifesaving.
- Continue operations, if possible.
- Notify the chain of command.

When you are decontaminating the crew compartment of a breached armored vehicle—

- Wear respiratory protection (protective mask or other approved respirator).
- Cover exposed skin (roll down sleeves, wear gloves, and such).
- Dust off uniform after leaving the vehicle and before removing protective mask.
- Always exercise standard field hygiene, including washing hands and face.